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Examination	Requested
Title of Invention	A process for preparing the liquefied vegetablefermented milk and powdered fermented milk



Abstract

The invention relates to the main materials the vegetable food including the bean etc. pee (the Cynanchi Radix or the brown rice). And it and the youghurt beverage is manufactured. It is about the method, for this being freeze-dry let moreover and manufacturing the fermented milk of powdery the youghurt beverage and the in this way manufactured powdery fermented milk. According to the invention, vegetable the fermented milk is manufactured with the method for including the step that inoculates the strain one kind of the Bifidobacterium and strain one kind of the Lactobacillus species (Lactobacillus bulgaricus) in soy oil (豆乳: bean is heat-treated and it defaces. It asks, it eliminates and manufactures separation) and the culture medium in which rice milk (after 米乳: Cynanchi Radix or the brown rice is heat-treated and it lets be sugared, it defaces and it juice-squeezes and it manufactures) are regularly mixed and fermented. In this way, in order that vegetable the manufactured fermented milk improves the integrity and portability, the lactic acid bacterial fermentation product of the new form which minimizes the break down of the nutrient component within not only the alive of the lactobacillus but also the fermented milk by letting freeze-dry the fermented milk in which the fermentation is completed, is manufactured.



Representative Drawing(s)

Fig. 1



Keyword(s)

The youghurt beverage, powdery fermented milk, soy oil, rice milk, bipidobacterium, lactobacillus.



Description

■ Brief Explanation of the Drawing(s)

Figure 1 shows the symbol according to the mixing ratio of the soy oil and rice milk is (the number of sense valuer which number answers).

Figure 2 is a graph showing the viable cell change of the Bifidobacterium bifidum according to the fermentation time and lactobacillus bulgaricus.

Figure 3 is a graph showing the change of the viable cell count according to the keeping time after the fermentation and freeze-drying termination.

■ Details of the Invention

■ Purpose of the Invention

■ The Technical Field to which the Invention belongs and the Prior Art in that Field

The invention relates to the main materials the vegetable food including the bean etc. pee. And it is about the liquid or the powdery fermented milk manufactured with the method, for manufacturing the youghurt beverage by and using the strain of the Bifidobacterium and strain of the Lactobacillus species the method for the in this way manufactured youghurt beverage being freeze-dry let and manufacturing the powdered fermented milk and such method. According to the invention, provided are the advantage can offer the fermented milk it nutritious without the problem of being caused by the animal nature milk because of manufacturing the fermented milk by using the vegetable material including the bean etc. pee, profitable, and that it is able to make maintain the survival rate of the at the same time useful lactobacillus with elevation because of the moreover manufactured fermented milk being freeze-dried and manufacturing with the powdered.

Recently, while the concern about the vegetable food is enhanced, the development and demand of the vegetable beverage which the bean etc. pee it uses is used for main materials increase the animal material like the milk. The case in which drink difficults manies and it is known as to the man having the lactose intolerance the saturated fatty acid which is caused by of the adult disease and content of the cholesterol including the arteriosclerosis and hypertension etc. high in case of the animal nature milk in the human body. But the cholesterol the useful the unsaturated fatty acid for vegetable drink a , for example, the human body including the soy oil or the rice beverage etc is included has the advantage that it is known as because of not being nearly included. And the lactose is not included. Therefore, it easily can drink without the problem of the lactose intolerance as anyone. The soy oil goes on sale to the replacement of the animal nature milk by using the advantage of this vegetable food. Moreover, except the beverage the rice to the main component recently receives the foot light.

In the meantime, the effort for the soy oil being fermented with the lactobacillus including the Bifidobacterium (Bifidobacterium) and lactobacillus etc. and to manufacturing vegetable the fermented milk and developing as for substitution of the animal nature yogurt furthermore had in the soy oil in which the bean was to the raw material and made one-stage. And many methods were consequently reindicated. But these the things about the flavor of the method for mainly manufacturing the soy oil from the bean or the bean unpleasant by using various lactobacilluses as the purpose of eliminating the grass smell (grassy smelling) of the soy oil characteristic and the methods masking the fermentation flavor. But in case of the fermented soymilk manufactured with these publicly known methods, it had no to consider the nutritional side of the bean itself. And it yet had no to consider for the lactobacillus extinction in the conservation of the moreover manufactured fermented milk and carrying. That is, in the pulses crops including the bean etc, amino acids that the human body to need are included the large amount. But the one of the essential amino acid methionine is known as the first limited amino acid. The other essential amino acid including the tryptophan etc. is enough contained. It is unable to desirable to the dietetics to ingest only the soybean protein. In the meantime, in the pee protein, the tryptophan etc. are insufficient but the insufficient methionine is contained in the soybean protein the large amount. Therefore, if it befittingly mixed these two kinds of vegetable foods and these inventors showed the amino acid supplement effect, it decided to could manufacture of the lactobacillus fermentation milk using this not only vegetable the excellent drink as the dietetics.

Moreover, in case of the fermented milk, although it kept in refrigeration, as the time passed, the tendency that the survival rate of the lactobacillus taking part in the fermentation remarkably diminished was shown generally. And in order to develop the method for solving problem on this conservation of the fermented milk in the technical field, attempt was therefore continued.

The method the survival rate of the lactobacillus used for the fermentation does not fall even if the time passes in the conservation of the fermented milk since these inventors solve problems known through the existing prior art as described above, and for improving the portability of the moreover manufactured fermented milk. And extensively, it studied. And the above-described lactobacillus was inoculated in the culture medium in which the soy oil and rice milk were appropriately mixed and it consequently fermented in the invention. It let freeze-dry after moreover, the fermentation end. In that way it confirmed to successfully could accomplish the purpose for to maximizing the survival rate of the lactobacillus and conspicuously improving portability and integrity and the invention was completed.

★ The Technical Challenges of the Invention

An object of the present invention are to provide the new yoghurt beverage with a superior nutritional and taste it manufactures by thus using the lactobacillus in the Bifidobacterium (Bifidobacterium) and lactobacillus the new vegetable drink the soy oil and rice milk are mixed the appropriate amount the conventional soy oil and the dietetics problem that the fermented soybean milk has are supplemented.

It is still another object of the present invention to provide the powdered fermented milk with a superior integrity and portability the survival rate of the lactobacillus is improved than the yoghurt beverage vegetable the manufactured fermented milk is freeze-dry let as described above.

★ Structure & Operation of the Invention

As described above, the invention relates to the main materials the vegetable food including the bean etc. pee. And it is about the method for and manufacturing the yoghurt beverage and the method for such yoghurt beverage being freeze-dry let and manufacturing the powdered fermented milk. Hereinafter, such method of the present invention is explained specifically.

1. The manufacture of the soy oil.

In the invention, it is manufactured with the conventional method from the whole soybean or the non-fat bean or 'soy oil' implies the soy oil going on sale. In the invention, the bean is swamped for example in the water of about 25-40°C about 5-10 hours. A part of the saccharides and the fusible element sapogenin is eliminated with hydrating the bean. After the in this way processed bean is heating processed among the water of 100°C 1-2 discrimination, it shatters to pieces and it makes slurry. After the insoluble component is eliminated from the slurry separation, the obtained slurry is neglected in about 80°C or greater about for 5 minutes. By disuniting the bean-curd dregs and soy oil by using the normal method including filtering, centrifuge etc. the soy oil can be manufactured. In this way, in the soy oil separating is about 100°C, after sterilizing about for 10 minutes and cooling, it uses according to the invention in the fermentation.

2. The manufacture of the rice milk.

In the meantime, by using the Cynanchi Radix, the brown rice, or their mixture, the rice milk used in the manufacture of the yoghurt beverage followed into the invention as and, the other raw material manufactures. In the invention, after processing heating the Cynanchi Radix and brown rice to the rice milk, it can use as the rice milk to immediately make slurry. Before making slurry, the glycosylated rice milk can be used in other ways after the glycosylating step. The malt sold to on the market can be used as the saccharogenic amylase. The germinated brown rice can be used. The Cynanchi Radix or the brown rice is be sugared let first and since the lactobacillus is created monosaccharide or the disaccharide can use in the fermentation amount of the saccharides added can be reduced in the fermentation by the advantage of the case of the rice milk being be sugared let and using. And the saccharides which lets be sugared than the saccharides which it moreover adds and obtained is etc. that the lactobacillus more effectively uses in the fermentation.

In the invention, the rice milk is for example manufactured with the method as follows. That is, firstly, the water is added to the Cynanchi Radix or the brown rice and it processes heating. While here adding the water, it shatters to pieces and it makes slurry. The insoluble component is eliminated from the obtained slurry to method such as juice and centrifuge and the rice milk is obtained. In the fermentation method followed into the invention, after the obtained rice milk is again in 100°C about for 10 minutes sterilizing process, it mixes to the soy oil and the constant rate which in the above case manufactures and it uses. And before making slurry the Cynanchi Radix or the brown rice processed heating to the other method, it processes as the diastatic enzyme including the malt or the germinated brown rice etc. and it can let be sugared. 1 hour extent shaking culture and enzyme is extracted firstly for this from the water of about 25°C. The insoluble component is eliminated to centrifuge etc. In this way, the manufactured diastatic enzyme is mixed with the Cynanchi Radix or the brown rice and while in about 60°C about 3 hours shaking culture, it lets be sugared. The insoluble component is eliminated to filtering, centrifuge etc. if saccharification is completed. It mixes to the soy oil and the appropriate rate which it in front of manufactures and it uses in the fermentation.

According to the invention, when being proceed the fermentation, the soy oil and the obtained rice milk can be used like that 1 and 2. But it more desirables to expedite the fermentation by the fixed amount addition and using the saccharides which the lactobacillus can use. If the saccharides which the lactobacillus can use, although anything, it can use as this purpose. But the sugar can be used preferably more preferably in the invention the sugar or oligosaccharide. That is, after letting be sugared or mixing everyone, and the soy oil and rice milk in case of not letting be sugared, the sugar is added and for the final sweetness degree, about 18 brix is and it can use in the fermentation.

In the invention, it mixes to the proper rate and the soy oil and rice milk can use in consideration of the taste, filling a suit the sourness, including, preference, the color and sensuousness etc. But the soy oil and rice milk are mixed to the ratio of 1:10 to 10:1 and it generally uses. Preferably, the soy oil and rice milk can use as the ratio of 2-8:8-2. And it more preferably uses as the ratio of 8:2.

3. Lactobacillus fermentation.

If the strain belonging to this inside, although anything, it can use as the lactobacillus belonging to the bifidobacterium used in the present invention. And for example, the Bifidobacterium bifidum, the Bifidobacterium longum, the Bifidobacterium breve (Bifidobacterium breviae), the Bifidobacterium infantis etc can be in come. And the Bifidobacterium bifidum is used more preferably. In the meantime, in the invention, it can use as the Lactobacillus bacteria although it feels among the public notice or marketing strains. Thus, the lactobacillus bulgaricus, the Lactobacillus acidophilus, the Lactobacillus casei etc. for example have of the strain belonging. And the lactobacillus bulgaricus is used more preferably.

After respectively separately inoculating in the mixture of the rice milk and soy oil and fermenting, it mixes and these two kinds of strains use, or it altogether together inoculates and the lactobacillus fermentation processing can be proceed. But two kinds of strain is inoculated together in the mixture of the rice milk and soy oil and the fermentation is proceed preferably in the invention. In the invention, after these strains purely cultivate by and using method the normal culture tub corresponding to each strain, it inoculates and the starter is made and it uses, or the strain going on sale to the lyophilized state can be used in other words. The initial bacteria number is about 10 the freeze-drying bacteria is inoculated the inoculum size as described above as described above in case of the starter manufactured based on the fermentation liquid to the concentration of about 1%. It in order to become over the / mL. Subsequently, the mixture of the rice milk and the soy oil in which the lactobacillus is vaccinated is fermented preferably in 37°C less than about 10 hours for about 7 hours. The fermentation treatment like that can use the fermenting device or the fermentation tank like using in the existing fermentation milk making. At this time, the report that off-flavor can become if the lactobacillus fermentation is done in the state where the oxygen has. Therefore, it favorables to full ferment container in the filled state in order to the head space (headspace) of the fermentation container to minimum if it possibles.

After the manufactured vegetable the fermented milk of the present invention ***s and it cools, it injects into container and it can manufacture with the beverage manufactures thing same like the liquid yoghurt. Moreover, the additional component including the outer tube in the product manufactured according to the present invention, the perfume, sweetener, and pigment and stabilizer etc can be added. The perfume in order that symbol suitables for etc., is generally used according to need in this technical field as edibility. For example, the component of fruit is added in the yoghurt beverage and it can manufacture with the product of the fruit type.

4. The manufacture of the powdery vegetable fermented milk.

As described above, in order to supplement the integrity and portability, it lets freeze-dry and the yoghurt beverage manufactured can manufacture with the powdery fermented milk. After the manufactured yoghurt beverage is frozen firstly enough for this in -80°C, it desiccates in the freezing dryer. It 10 Torr this harrow and as to freeze-drying, pressure is preferably proceed at a temperature of -45°C or less. After the fermented milk in which freeze-drying is completed shatters to pieces and it makes with the powdered state, it like that charges in container, or it compresses and it in other words can manufacture in the form of the tablet. In this way, it again dissolves in the water or the existing beverage and it is restored to the former state in drink to the yoghurt beverage state and the frozen fermented milk drinks, or it in other words like that can take the powdered state.

In the powdery fermented milk manufactured with this method, the same lactobacillus as the yoghurt beverage of the drying former of number survives. And the effect the yoghurt beverage is drunk, similar can be obtained therefore.

Working example.

The invention is more particularly explained with the working example of less than. With these each working examples being offered the understanding of being clear of the present invention to purpose the purport of the present invention and range are not escaped. It variously can metamorphose. And these working examples does not restrict the scope of the present invention to any kind of type.

Working example 1.

(1) The manufacture of the rice milk and soy oil.

After the bean 700g was swamped among the water 3ℓ of about 25℃ for about 5 hours, it processed heating among the water 3ℓ of 100℃ 1–2 discrimination. Thereafter, it shattered to pieces to mixer and it made slurry. After it filtered from the slurry and the insoluble component was eliminated separation, the obtained slurry was neglected at a temperature of about 80℃ about for 5 minutes. It separated centrifugal in filtering and 3,000rpm and the bean–curd dregs and soy oil were disunited and the soy oil about 2.1ℓ was manufactured. The obtained soy oil was heated in about 100℃ about for 10 minutes and it sterilized and it cooled to the room temperature.

Separately, in the water 400 m ℓ of about 25℃ the malt 100g, it separated centrifugal after 1 hour extent shaking culture heartburnings and the insoluble component was eliminated and the diastatic enzyme about 300m ℓ was obtained. In this way, the obtained diastatic enzyme 250m ℓ was put into the Cynanchi Radix 100g. It heated while being mixed in about 60℃ for about 3 hours. While here pouring the water, it shattered to pieces and it made slurry. By the obtained slurry being filtered and separating centrifugal in 8,000 rpm and eliminating the insoluble component the rice milk about 350mℓ was obtained. The obtained rice milk was heated again in 100℃ about for 10 minutes and it sterilized.

(2) Fermentation.

The *Bifidobacterium bifidum* (*Lactobacillus bifidum*) and the *Lactobacillus bulgaricus* each starter activated for one night in the appropriate solid medium were added in the soy oil manufactured in (1) and the mixture 400 mℓ mixing the rice milk to the ratio of 8:2 to the concentration of 1% (v/v) and it fermented in 37℃ for about 7 hours. After the obtained fermented milk was ***ed and it cooled, it injected into container and the liquid yoghurt was manufactured.

(3) The manufacture of the powdery vegetable fermented milk.

After the yoghurt beverage manufactured (2) was frozen in –80℃ for about 2 hours, it let freeze–dry to pressure less than temperature less than –45℃ and 10 Torr in the fixed freezing dryer. The fermented milk supplied separately was to pieces shattered and vegetable the fermented milk about 100g of powdery was manufactured.

Working example 2.

The rice milk let be sugared was mixed with the soy oil manufactured in (1) of above statement example 1 to the various rate and the yoghurt beverage was manufactured according to (2) of the working example 1 and preference was examined.

Until the sweetness degree arrived in to 18 brix, the sugar was added in each and it revised in the soy oil and the rice milk manufactured from (1) of the working example 1. In this way, the soy oil and the manufactured rice milk were mixed to the rate of the respective 5:5, 6:4, 7:3, 8:2, 9:1, 10:0. The *Lactobacillus* was inoculated here and it fermented. The sensory evaluation was enforced in order to examine the preference of the manufactured fermented milk after the fermentation of about 7 hours. The result was shown for fig. 1.

In the overall side including the thing mixing the soy oil and rice milk from the result shown for fig. 1 in all items except for colour to 8:2 is the sourness, the taste filing a suit, and texture etc, it was determined because of most excellenting.

Working example 3.

After the fermentation began to the method of (2) of the working example 1, the change in the viable cell count of the *Lactobacillus* was measured according to the pass of the time. After beginning the fermentation, by

withdrawal and using the dilution coating method, *Bifidobacterium* and *Lactobacillus* each viable cell count were measured at hourly. The result was shown for fig. 2.

As shown in it could know from the result reindicated in fig. 2, in the fermented milk manufactured from (2) of the working example 1, the fermentation was completed to the fermentation time of about 7 time about. And the change of the viable cell count had no although 30 hours thereafter passed. Therefore, in the fermentation condition from such result, it could know to show the viable cell count which was nearly similar both *bifidobacterium* the fermentation could know the it was enough 10 hours this narrow thing and *lactobacillus*.

In the meantime, about 5×10^8 after the method similar by using the skimmed milk powder and fermentation done the viable cell count is measured the fermented milk is manufactured the *lactobacillus* is used. The cell / ml was shown, this microbial content seemed the viable cell count which was nearly similar in the upper part to the fermented milk using the vegetable material. Therefore, the fact that vegetable the fermented milk manufactured from the invention enough could replace function called the intake of the useful bacteria of the fermented milk using the existing milk could be known.

Working example 4.

The yoghurt beverage manufactured according to (2) of the working example 1 was freeze-dry let according to the method of (3) of the working example 1. After the aridity was completed, while safekeeping the fermented milk of the liquid which it did not desiccate with the thing desiccated in 4°C , the survival rate of the *lactobacillus* was examined in hourly. The result was shown for fig. 3.

As the time passed, the fermented milk of the powdered state which closed the fermentation and let freeze-dry could know visibility change nearly had no with the initial bacteria number. A week or greater at least could know without the difference the change of both the liquid the same experiment was enforced in the room temperature in the room temperature and powdered viable cell count compared to the things kept in refrigeration and the some extent difference had, and but big, and the archaic viable cell count to keep. Moreover, in case of the dry fermented milk, even if the water was put and it again converted into the liquid, the yoghurt beverage and difference of the drying former could not be out found at taste or flavor.

■ Effects of the Invention

As described above, in the invention, it can obtain the lactic acid bacteria count of the level which nearly the same like the fermented milk using the existing milk and vegetable the liquid and the powdered fermented milk which it manufactures by using the soy oil and rice milk can replace the animal food with the vegetability profitably to the health. Moreover, in this way, the manufactured vegetability liquid type fermented milk is freeze-dry let. The integrity and portability can be improved remarkably while the survival rate of the *lactobacillus* nearly does not change.



Scope of Claims

Claim 1 :

The method it characterizes to cultivate the mixture of the rice milk and soy oil the strain of the strain of the *Bifidobacterium* and *Lactobacillus* species and mixing and ferment and for manufacturing the yoghurt beverage.

Claim 2 :

The method for characterizing to mix the soy oil and rice milk to the ratio of 1:10 to 10:1 and use as to the first claim.

Claim 3 :

The method for characterizing to mix the soy oil and rice milk to the ratio of 8:2 and use as to claim 2.

Claim 4 :

The method for characterizing the rice milk the rice milk lets be sugared the Cynanchi Radix, the brown rice, or their mixture as to the first claim and it obtains.

Claim 5 :

The method the sugar or oligosaccharide is added in the soy oil and rice milk before cultivating as to the first claim with strain and for characterizing that the final sweetness degree adjusts so that 18 brix be.

Claim 6 :

The method which is selected as to the first claim from the group consisting of the lactobacillus bulgaricus, the Lactobacillus acidophilus, and the Lactobacillus casei, and the strain of the Lactobacillus species characterizes to be selected from the group consisting of the lactobacillus bulgaricus, the Lactobacillus acidophilus, and the Lactobacillus casei.

Claim 7 :

The method the Bifidobacterium bifidum being used as to claim 6 as the strain of the Bifidobacterium, and for characterizing that the lactobacillus bulgaricus is used as the strain of the Lactobacillus species.

Claim 8 :

The method for characterizing that the Bifidobacterium bifidum and lactobacillus bulgaricus are used as to claim 7 in the form of the respective starter as the concentration of 1% for the fermentation.

Claim 9 :

The form supplied separately the Bifidobacterium bifidum and lactobacillus bulgaricus as to claim 7 the respective initial bacteria number 10.5The method for characterizing to use as the ratio of a /ml in the fermentation.

Claim 10 :

The method for characterizing to additionally let freeze-dry the manufactured yoghurt beverage as to the first claim and manufacture the fermented milk with powdery.



Drawings

Fig. 1

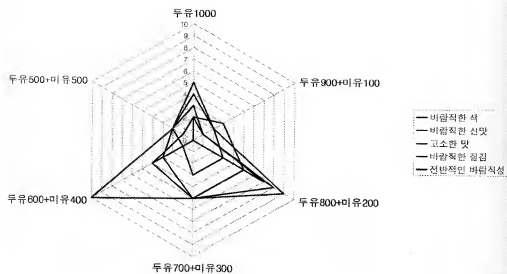


Fig. 2

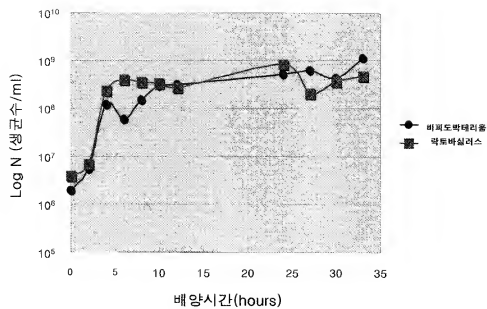


Fig. 3

